EXTRACTS FROM THE REPORT OF THE DIRECTOR OF THE UNITED STATES MINT.

Industrial Employment of Gold and Silver.

The value of the gold bars furnished for industrial use during the calendar year 1887 was 11,672,606.10 dollars; silver bars, 5,241,998.49 dollars; total, 16,914,604.59 dollars.

On the basis of the last direct reports of the use of coin, the *industrial employment of the precious metals for the calendar year* 1887 is estimated as follows: Gold, 14,600,000 dollars; silver, 5,280,000 dollars.

Price of Silver.

On July 1st, 1887, the London price of silver was 44 pence. The highest price was reached August 26th, 1888, namely, $45\frac{3}{16}$ pence; the lowest, May 19th, namely, $41\frac{3}{4}$ pence. At the close of the fiscal year, June 30th, 1888, the price was $42\frac{1}{4}$ pence.

Production of Gold and Silver.

The production of gold and silver in the United States for the calendar year 1887 is estimated to have been:—

——	Fine Ounces.	Coining Value.
		Dollars.
Gold..............................	1,596,375	33,000,000
Silver..............................	41,268,305	53,357,000

The production of gold and silver in the world for the last four years is exhibited in the following table:—

Calendar Years.	Gold.		Silver.	
	Kilos.	Value.	Kilos.	Coinage Value.
		Dollars.		Dollars.
1884.............	153,017	101,694,000	2,665,380	110,773,000
1885.............	150,103	103,744,000	2,951,760	122,799,800
1886.............	149,355	99,250,877	3,027,632	125,828,100
1887.............	149,018	99,056,850	3,259,144	135,149,410

The production of gold has remained nearly constant, while the *production of silver has increased in the last four years about* 25,000,000 dollars.—*Engineering and Mining Journal.*

Monthly Patent List.

* The dates given are the dates of the Official Journals in which acceptances of the Complete Specifications are advertised. Complete Specifications thus advertised as accepted are open to inspection at the Patent Office immediately, and to opposition within two months of the said dates.

I.—GENERAL PLANT, APPARATUS, AND MACHINERY.

APPLICATIONS.

16,728. J. Cooper, Manchester. Blast or air supply pipes for gas-producers and other furnaces. November 17.

16,761. R. Reichling, London. Apparatus for condensing steam and for heating and purifying feed water. *Complete Specification.* November 17.

16,783. J. Laidlaw, Glasgow. Improvements in the construction of Weston's oscillating centrifugal machines. November 19.

16,791. J. Laidlaw, Glasgow. Improvements in the construction of Weston's centrifugal machines. November 19.

17,012. R. Hasenclever, London. Apparatus for subjecting pulverulent or granular materials to the action of gases. Complete Specification. November 22.

17,072. H. H. Lea, London. Means and apparatus for neutralising or destroying noxious or offensive gases, vapours, or fumes produced in the manufacture or treatment of chemical and other products. November 23.

17,425. J. Buchanan, Glasgow. Fluid pressure and vacuum gauges. November 29.

17,521. E. J. T. Digby, London. Improved means for manufacturing crucibles, or the like vessels or utensils. December 1.

17,564. Sir Lowthian Bell, Bart., London. Evaporating brine and other solutions. December 1.

17,567. W. Lezius, London. Process and apparatus for subjecting animal or vegetable matter or chemicals to liquid extraction. December 1.

17,578. S. A. de Normanville, Liverpool. Taps, cocks, and valves. December 3.

17,661. G. E. Davis, Manchester. Apparatus for the combustion of smoke and smells and of carbonaceous vapours. December 4.

17,664. G. E. Davis, Manchester. Furnaces for the evaporation of liquids from paper-mills and bleach works. December 4.

17,809. W. R. Watson and R. A. Robertson, Glasgow. Apparatus for evaporating, concentrating, and distilling liquids. December 6.

18,025. D. McColley Weston, London. Centrifugal machines. Complete Specification. *December* 11.

18,031. S. A. Ward, Sheffield. Generating steam and vapour, and apparatus therefor. *December* 11.

18,039. N. L. Hilton, Manchester. Improvements in agitators. Complete *Specification. December* 11.

18,085. A. E. Tavernier and E. Casper, London. An improved pressure gauge. *December* 11.

18,138. J. Walworth, Bradford. Furnace for the production of hot air. *December* 12.

18,153. J. Foxall, Newport, Mon. The control of the pressure of gas, fluids, and liquids. *December* 12.

18,177. H. R. Gregory and G. MacDonald, London. Manufacture of filtering material applicable to the filtration and purification of water, sewage effluents, saccharine juices, alcoholic liquors, and other liquids and fluids. December 12.

* *COMPLETE SPECIFICATIONS ACCEPTED.*

1887.

17,576. W. Varrall. An improved filter. December 8.

1888.

1589. H. E. Newton.—From E. Theisen. Apparatus for evaporating and cooling purposes. December 8.

1923. J. A. Drake and R. Muirhead. Filter presses. December 15.

2037. H. J. Peck.—From H. G. Downton. Apparatus for subjecting substances to the action of air or gases, for drying, disinfecting, oxygenating, or otherwise treating same. November 21.

2105. B. J. Springuel and A. Bollinckx. Apparatus for removing liquid produced by condensation. December 15.

2208. J. Scott. *See* Class XIX.

2511. A. Chapman. *See* Class XVI.

4398. T. G. Pascall. A combined evaporating and propagating pan. November 24.

14,988. R. R. Hutchinson. *See* Class XVII.

15,856. R. Kennedy. Mercurial vacuum pumps. December 8.

II.—FUEL, GAS, AND LIGHT.

APPLICATIONS.

16,662. T. Chappell, London, and J. H. Key, Newton Abbott. A process of treating lignite, to be called "The patent lignite fuel." November 16.

16,747. J. H. Cochrane, London. Apparatus for discharging coke ovens. November 17.

16,927. R. R. Hutchinson, London. Improved method of generating gas from hydrocarbon oils, and apparatus therefor, applicable to kilns, furnaces, or the heat chambers or *flues of* steam boilers. November 21.

16,953. W. Hubbard, London. Improvements in the manufacture of artificial fuel. November 21.

16,958. J. E. Dowson and A. Dowson, London. Improvements in apparatus for use in the treatment of gas. November 21.

16,970. B. H. Thwaite, Liverpool. Improved methods of producing combustible gases, and apparatus therefor. November 22.

17,020. F. V. Hadlow, Buxted. An improvement in the treatment of coal. November 23.

17,074. W. B. G. Bennett, London. Improvements in apparatus or arrangements for artificial lighting by the combustion of liquid hydrocarbons while exposed to the action of a blast of compressed air. November 23.

17,168. G. Heeley, Sheffield. A shell lime cylinder or disc, to be used for lime-light purposes. November 24.

17,176. R. Nicholls, London. Improvements in obtaining light and heat, and in apparatus employed therefor. November 26.

17,337. G. M. Westman, London. Process for the manufacture of illuminating gas and coke. Complete Specification. November 28.

17,411. G. R. Blake, Crewkerne. A fire-lighter. November 30.

17,517. F. J. Jones, Leek. An improved method and apparatus for manufacturing gas. December 1.

17,562. De Witte Stearns, London. Improvements relating to apparatus for the production of gas from liquid hydrocarbon, and to devices for the utilisation of gaseous fuel. Complete Specification. December 1.

17,583. J. F. M. Pollock, Leeds. Machinery for moulding and compressing blocks of coal dust, clay, cement, &c., with or without agglomerates. December 3.

17,609. J. Brown, London. Improvements in apparatus employed in the manufacture of gas for prevention of stoppages in pipes. December 3.

17,613. F. J. Jones and L. C. Alexander, London. Improvements in apparatus for the manufacture of gas for illuminating and other purposes, which improvements also render said apparatus suitable for other uses. December 3.

17,659. H. Baker, Derby. Improved apparatus for carburetting coal gas. December 4.

17,661. G. E. Davis. *See* Class 1.

17,738. J. A. Yeadon and R. Middleton, Leeds. Improvements in machinery for manufacturing blocks or briquettes of fuel or materials for smelting or analogous purposes. December 5.

17,822. J. V. Griffiths and C. Sureties, London. Compressed fuel. December 6.

17,869. F. B. Hill, London. Improvements in apparatus for utilising liquid hydrocarbon for lighting and heating purposes. December 6.

17,904. J. Willoughby, London. Improvements in apparatus for heating air, consuming smoke, and improving the draught of all kinds of boilers, such air being also applicable for other heating purposes. December 7.

17,954. J. Redpath, Hull. The instantaneous lighting of fires without the use of wood or paper, to be called the "Acmé" instantaneous and indestructible perpetual fire-lighter. December 8.

18,027. W. T. Bate, Conshohocken, Pa., United States. Apparatus for the manufacture of gas. December 11.

18,105. T. Shaw, London. Improvements in apparatus for testing and detecting the presence of gases or gaseous mixtures. Complete Specification. December 11.

COMPLETE SPECIFICATIONS ACCEPTED.

1887.

11,537. O. Bowen, A. S. Tomkins, and J. Cobeldick. Manufacture of charcoal. December 1.

16,513. F. Pool. Appliance for scraping the insides of gas retorts and the removal of the deposit therefrom. November 21.

1888.

723. J. West. Apparatus for charging and drawing gas retorts. November 21.

737. E. Schoop.—From M. Jouannique and Co. New agglomerated fuel. December 1.

2322. J. B. Terrace. Fireclay gas retorts. December 15.

2513. E. W. Harding. Manufacture of solid fuel, and production of coal gas. December 22.

2628. O. Bowen. Artificial or compressed fuel. December 22.

4114. G. H. Lilley. Porous blocks for effecting the combustion by absorption of liquid hydrocarbons and other inflammable liquids. December 15.

6123. R. Best Helliwell. Firelighters. December 8.

9137. J. Morris. Manufacture of artificial fuel. December 8.

10,137. J. Bowing. Manufacture of fuel from coal, slack, &c., and obtaining hydrocarbons therefrom. December 22.

14,872. J. McMurray Rose. Manufacture of gas. November 21.

15,407. D. P. Mudie. Preventing the choking of pipes from retort to hydraulic main in gasworks by means of baffle plates placed in mouthpiece of retort. December 8.

15,492. H. O. A. E. Grünbaum. Solidifying petroleum and other explosive oils for transport, and as fuel for lighting and heating. December 15.

III.—DESTRUCTIVE DISTILLATION, TAR PRODUCTS, Etc.

APPLICATIONS.

16,716. W. P. Thompson.—From C. Rave, Belgium. Improvements in or relating to the treatment of the acid residuums or tars resulting from the refining of mineral oils by concentrated acids. November 17.

17,815. W. D. A. Bost and T. F. Haldane, Glasgow. Improvements in the manufacture of acetic acid and other products from wood. December 6.

COMPLETE SPECIFICATION ACCEPTED.

1888.

607. C. Rave. Treatment of the acid residuums or tars resulting from the refining of mineral oils by concentrated acids. December 22.

IV.—COLOURING MATTERS AND DYES.

APPLICATIONS.

17,094. C. F. X. Noroy, London. A new or improved dyeing material, and method of employing the same. November 24.

17,333. C. D. Abel.—From The Actien Gesellschaft für Anilin Fabrikation, Germany. A new manufacture of orange and red dyestuffs. November 28.

17,369. T. Parker and A. E. Robinson, Manchester. Improvements in the manufacture of mono-nitro-naphthalene. November 29.

17,402. C. Dreyfus, London. The production of colouring-matters. November 29.

17,403. C. Dreyfus, London. The production of colouring-matters for dyeing and printing. November 29.

COMPLETE SPECIFICATIONS ACCEPTED.

1888.

2664. H. H. Lake.—From A. Leonhardt and Co. Production of colouring-matters. November 21.

15,490. J. C. L. D. Kœchlin, D. E. H. Kœchlin, and A. J. J. d'Andiran Kœchlin. A composite indigo dye. December 8.

V.—TEXTILES, COTTON, WOOL, SILK, Etc.

APPLICATIONS.

17,429. G. L. P. Eyre and T. J. Hopkins, London. Improvements in the process of treating and scouring wool and other materials containing greasy, oily, or fatty matters, and in machinery applicable thereto and to other purposes. November 29.

17,574. H. Sauvage, Dundee. The conversion of jute textiles. December 3.

COMPLETE SPECIFICATION ACCEPTED.

1888.

9115. R. Haddan.—From P. Mol. Manufacturing artificial wool from ramie and other vegetable fibres. December 22.

VI.—DYEING, CALICO PRINTING, PAPER STAINING, AND BLEACHING.

APPLICATIONS.

16,634. W. Haigh, Manchester. Improvements in the method of and apparatus for printing upon folded piece goods. November 16.

16,755. J. Hussong and H. Hussong, London. Improved apparatus for dyeing hanks or skeins of yarn, and for other analogous purposes. November 17.

16,756. C. L. Klauder, London. Improvements in apparatus for dyeing or scouring yarn. Complete Specification. November 17.

16,864. J. Clegg, Liverpool. Improvements in or relating to apparatus for cleansing, scouring, bleaching, mordanting, colouring, steaming, and dyeing textile and other fabrics, and the raw and the unspun and the spun fibrous or porous substances used in their manufacture. November 20.

17,263. E. M. H. Andreoli, London. Improvements in bleaching paper pulp and other vegetable substances. Complete Specification. November 27.

17,271. F. E. Anderson and S. Hodgson, London. Improvements in the method of and in apparatus for dyeing, scouring, or washing wool and other materials. Complete Specification. November 27.

17,317. J. W. Bannister, London. Improvements in dyeing woollen and other woven or felted fabrics. Complete Specification. November 29.

17,441. E. Bentz and G. J. Newman, jun., Manchester. New mordants and fixing agents for use in dyeing or calico printing. November 30.

17,544. G. Young, London. Improvements in mechanism or apparatus for dyeing and bleaching cotton, wool, silk, and other fibrous materials in the raw and manufactured or partly manufactured state. December 1.

18,010. J. Imray.—From La Société Anonyme des Matières Colorants et produits Chimiques de St. Denis, France. Improvements in dyeing cotton or other vegetable fibres with blended colours. December 10.

COMPLETE SPECIFICATIONS ACCEPTED.

1888.

958. A. McNab. Boiling, bleaching, or washing textile fabrics, and apparatus therefor. November 24.

1954. S. Spencer. Machines for mordanting, dyeing, washing, and sizing hanks of yarn. December 15.

16,756. C. L. Klauder. Apparatus for dyeing or scouring yarn. December 22.

VII.—ACIDS, ALKALIS, AND SALTS.

APPLICATIONS.

17,037. F. Joaquin, R. Carulla, and E. M. Glover, Derby. Improvements in the manufacture of sulphate of ammonia. November 23.

17,069. H. H. Lake.—From O. B. Peck, United States. Improvements relating to the *desulphurisation* of ores, and the decomposition of metallic salts and similar compounds. Complete Specification. November 23.

17,183. J. B. Thompson, London. Improvements in the reduction of hydrogen sulphide for the production of sulphur therefrom. November 26.

17,316. T. Parker and A. E. Robinson. *See* Class XVI.

17,367. T. Parker and A. E. Robinson, Manchester. Improvements in the manufacture of chlorine. November 29.

17,447. T. Parker and A. E. Robinson, Manchester. Improvements in the manufacture of cyanogen compounds from sulpho-cyanides. November 30.

17,528. J. Barrow, London. Improvements in the treatment of gases, and recovering of sulphur from sulphuretted hydrogen evolved in various manufacturing processes. December 1.

17,541. M. Flaschendräger and H. Flaschendräger, London. Improvements in flat or prismatic evaporating pans for the treatment of salt. December 1.

17,561. Sir Lowthian Bell, Bart. *See* Class I.

17,569. F. Foster, London. Improvements in apparatus for generating carbonic acid gas. December 1.

17,807. J. Y. Howson, Stockton-on-Tees. Improvements in or relating to the treatment of salt, and in the means employed therefor. December 6.

17,915. G. C. Dymond.—From C. E. D. Winssinger, Belgium. Improvements in the process of manufacturing bicalcareous phosphate called precipitated phosphate. Complete Specification. December 8.

18,013. E. A. Mebus, London. Improvements in the plant used in the manufacture of soda crystals. December 10.

18,028. W. T. Gibbs, London. Improvements in the manufacture of the halogen compounds of boron, of silicon, and of the metallic elements. December 11.

18,056. A. Campbell and W. Boyd, Glasgow. Improvements in obtaining chlorine. December 11.

COMPLETE SPECIFICATIONS ACCEPTED.

1887.

17,908. M. N. d'Andria. Separating arsenic from hydrochloric acid. November 24.

17,909. M. N. d'Andria. Treating liquid acid residues from galvanising works to obtain products therefrom. November 24.

17,181. L. G. G. Daudenart. Method and apparatus for manufacturing hydrated phosphates, and recovering by-products. December 22.

17,347. E. Meyer. Production of ammonia, oxalic acid, and alkaline salts from molasses or from desaccharised lyes, without carbonisation. December 22.

1888.

1371. J. Hargreaves, T. Robinson, and J. Hargreaves. Treatment of alkali waste to obtain sulphuretted hydrogen, &c. and apparatus therefor. December 15.

1495. A. M. Chance and J. F. Chance. Treating sulphides of sodium and potassium to obtain sulphuretted hydrogen, and apparatus therefor. December 15.

2104. H. W. Deacon and F. Hurter. Manufacture of chlorine. December 15.

2311. H. W. Deacon and F. Hurter. Manufacture of chlorine. December 15.

2495. A. M. Chance and J. F. Chance. Treating sulphate of lime and other oxidised sulphur compounds of calcium to obtain sulphuretted hydrogen, and apparatus employed therein. December 8.

4262. A. Boake, F. G. A. Roberts, A. Shearer, and W. B. Giles. Manufacture of sodium-meta-sulphite. December 22.

13,462. C. Glaser and C. F. W. Dambmann. Converting insoluble phosphoric acid contained in mineral and petrified phosphates into available phosphoric acid. December 8.

14,857. J. A. Just. Apparatus for the production of chlorine. November 24.

14,859. J. A. Just. Production of chlorine. November 24.

VIII.—GLASS, POTTERY, AND EARTHENWARE.

APPLICATIONS.

16,644. J. B. Gamlin and J. Tinney, Bridgwater. The manufacture of marbleised enamelled vases, urns, flower-pots, and other hollow vessels of a similar description. November 16.

16,737. T. Soufflet-Leblon, London. A new or improved description of mosaic tile, and mode of manufacturing the same. Complete Specification. November 17.

16,772. H. S. Till, Newcastle-under-Lyme. The use of glass with pottery or porcelain in the construction of articles usually made of one of these materials. November 19.

17,503. J. Cadbury, Birmingham. Improvements in machinery for polishing or surfacing glass for various purposes. December 1.

17,635. W. W. Macvay and R. Sykes, London. Improvements in the manufacture of bottles and other hollow ware in glass, and in apparatus to be used therein. December 3.

17,761. W. Gibbs, London. An improvement in painting and burning the paint on to glass globes, shades, and all bent or blown glass. December 5.

17,985. W. Boulton, London. Improvements in or applicable to apparatus for blending or equivalently treating potters' clay and other substances. December 8.

18,101. P. A. Newton.—From J. Henning and F. Wrede, Germany. Improvements in the process of manufacturing bottles or other hollow bodies of glass, and in apparatus therefor. Complete Specification. December 11.

18,238. W. Ambler, London. Improvements in the manufacture of cylindrical and tubular articles of glass, and of sheet glass December 13.

COMPLETE SPECIFICATIONS ACCEPTED.

1887.

17,530. J. Armstrong. Method of blowing and moulding glass, and apparatus therefor. November 24.

1888.

284. M. J. Adams. Floor tiles. December 15.

679. J. Haly. Manufacture of glass tiles, &c. November 24.

1764. R. Stanley. *See* Class IX.

14,052. E. Leak and H. Aynsley. Manufacture of "pins" used in supporting pottery ware while being baked or fired. November 24.

IX.—BUILDING MATERIALS, CLAYS, MORTARS AND CEMENTS.

APPLICATIONS.

16,753. A. Gray, London. Grinding Portland and Roman cements and other cements of similar nature. November 17.

16,770. C. O. Weber and F. W. Follows, Manchester. Improvements in artificial stones or blocks, applicable for grinding, crushing, granulating, polishing, and other similar purposes. November 19.

16,811. W. Joy, London. Improvements in apparatus for crushing and grinding cement, clinker, and similar matters, and for separating the finer from the coarser particles of ground cement, clinker, and similar matters. November 19.

17,257. W. Cussans, London. Improvements in colouring and ornamenting Portland cement for the manufacture of imitation grained or figured marble mosaics, ornamental slabs, tiles, and other forms, either plain or in mixed colours. November 27.

17,312. R. Warwick, Plaistow. Improvements in fibrous plastering work, and in materials used in same, and in the manufacture of slabs or plaques in connexion with the same trade. November 28.

17,303. J. Hargreaves, T. Robinson, and J. Hargreaves, Liverpool. Improvements in the manufacture of cement and in apparatus employed therein. November 29.

17,563. W. Lindsay, London. Improvements in fireproof floors. December 1.

17,583. J. F. M. Pollock. *See* Class II.

17,841. E. Robbins, London. A new or improved compound cement or concrete; manufacture, use, and application thereof. December 6.

COMPLETE SPECIFICATIONS ACCEPTED

1888.

667. M. Mackay. Composition for fusible cements. December 1.

1294. J. Cliffe. Fibrous asphalt composition for rendering concrete roofs and walls, and other structures waterproof and damp proof, and method of applying same. December 1.

1764. R. Stanley. Ovens or kilns for burning bricks, tiles, &c. December 22.

1884. R. Muirhead. *See* Class XVIII.—B.

1980. M. H. Heys. Manufacture of lime and of natural and artificial cements. December 22.

2271. J. Bassett and F. N. Seyde. Construction of fireproof ceilings and partitions. December 15.

2288. H. L. Storey and I. H. Storey. Manufacture of decorative material for application to walls and other surfaces. December 22.

2841. W. E. Constable and J. Joseph. Manufacture of artificial stone. December 8.

2803. J. Brunton and L. Griffiths. Manufacture of artificial stone. December 22.

2815. M. Fawcett. Construction of fireproof floors. December 15.

10,525. A. J. Boult.—From A. F. W. Dohring. Water and fireproof floors, ceilings, &c. December 22.

X.—METALLURGY, MINING, ETC.

APPLICATIONS.

16,671. W. C. Roberts-Austen, E. J. Ball, and A. Wingham, London. Improvements in the manufacture of iron and steel. November 16.

16,674. F. W. Kohler and A. Breden, London. Improvements in the process of and apparatus for zincing metal articles. Complete Specification. November 16.

16,692. W. Anderson, London. Improvements in tempering or annealing cylinders and hollow bodies. November 16.

16,727. D. L. Davies, Bristol. An improved miners' safety lamp. November 17.

16,796. J. H. Pollok, Glasgow. An improvement in the wet method of extracting gold from crushed ores or other finely divided auriferous material. November 19.

16,800. E. Carter, London. The more economical and quicker reduction of all kinds of iron ore, with less blast and less fuel than by the methods at present adopted, by the ores being brought into a granular or atomic state, and so apportioned or treated that the earths, silica, lime, and alumina shall be in the most easily fusible proportions. November 19.

16,821. A. Arche, London. Improvements relating to the separation of lead from silver and from other substances associated therewith. November 19.

16,830. W. Ackroyd and A. Ackroyd, London. Improvements in means or apparatus for registering the supply of air to mines and other places; also for denoting the variations in such supply. November 20.

16,848. A. Gutensohn and J. M. James, London. An improved apparatus for pickling or cleaning the surface of iron and other metal, to prepare the same for coating with tin or other metal. Complete Specification. November 20.

16,854. G. M. Edwards and W. J. Griffiths, London. Improvements in machinery for use in dressing or concentrating tin and other mineral ores and for other useful purposes. November 20.

16,872. A. Ritter von Klinkosch and I. Ritter von Klinkosch, London. Improvements in the process of and apparatus for making spoons and table forks of silver and other metals and alloys. Complete Specification. November 20.

16,916. T. Parker and A. E. Robinson, Manchester. Improvements in and relating to the manufacture of sulphide of aluminium, and of aluminium and its alloys. November 21.

16,955. W. Anderson, London. Improvements in annealing gun tubes and other tubes and hoops. November 21.

17,016. J. Baxeres, London. A chlorine-acid-saline-chlorination process for the extraction by chlorinating, in the wet way, of the antimony, bismuth, copper, cobalt, gold, lead, nickel, platinum, silver, tin, zinc, from their ores, regulus, speiss, alloys, &c. November 23.

17,067. H. H. Lake.—From O. B. Peck, United States. Improvements in apparatus for separating metal and other substances from molten slag. Complete Specification. November 23.

17,068. H. H. Lake.—From O. B. Peck. An improved process of separating metals and other substances from molten slag and the like. Complete Specification. November 23.

17,106. H. Aitken, Glasgow. Improvements in obtaining metals from ores, the same being particularly applicable to the obtainment of gold. November 24.

17,120. J. D. Ellis, Sheffield. Improvements in the method of making steel castings. November 24.

17,269. G. Prout and D. Murray, London. An improved method of coating iron or steel plates with copper and other comparatively non-oxidisable metals. November 27.

17,270. M. Graff, London. Improvements in the manufacture of steel. Complete Specification. November 27.

17,324. L. H. Cahaigne, London. Improvements in apparatus for the treatment of zinc. November 28.

17,336. G. M. Westman, London. Furnace for the manufacture of zinc, iron, phosphorus, sodium, and other substances, also the process of manufacturing them. Complete Specification. November 28.

17,368. T. Parker and A. E. Robinson, Manchester. Improvements in the manufacture of silicon-bronze. November 29.

17,373. R. Middleton, Leeds. An improved mode and manner of preparing materials for carrying out the operation of smelting and the like. November 29.

17,383. R. B. Hansell, Sheffield.—Partly communicated by E. E. Ries, United States. Improvements in the method of and apparatus for heating, tempering, and toughening metals. November 29.

17,100. H. H. Lake.—From P. Manhes, United States. Improvements relating to the treatment of nickel and cobalt. November 29.

17,110. H. H. Lake.—From P. Manhes, France. Improvements relating to the treatment of nickel and cobalt, and to apparatus therefor. November 29.

17,420. A. Wylie, London. Improvements in the method of and in machinery for the manufacture of metallic pipes and rods, and for covering the same, and telegraph and telephone cables and wires, with lead or metallic compounds for electric purposes. November 29.

17,450. C. A. Burghardt, Manchester. Improvements in the recovery of zinc from its ores. November 30.

17,451. G. M. Edwards and W. J. Griffiths, London. Improvements in machinery and appliances for dressing or concentrating auriferous and other mineral oils when in a pulverised and dry condition. November 30.

17,476. W. Charnocks, Liverpool. Improvements in or connected with the coating of metals with other metals or alloys. November 30.

17,486. J. Woolford, London. Improvements in the extraction or separation of metals from ores (simple or complex or refractory), or slags, or metallic compounds, or other metals. Complete Specification. November 30.

17,505. T. G. Barlow-Massicks, Middlesbrough. Improvements in the constructive material of tuyere coils for blast or other furnaces or cupolas. December 1.

17,614. B. J. B. Mills.—From T. A. Edison, United States. Improvements in methods of and apparatus for effecting the separation of metals from their ores. December 3.

17,638. G. G. Mullins, London. Improvements in the manufacture of iron. Complete Specification. December 4.

17,738. J. A. Yeadon and R. Middleton. *See* Class II.

17,810. J. H. Pollok, Glasgow. An improvement in the wet method of extracting gold from crushed ores or other finely-divided auriferous material. December 6.

17,858. L. Q. Brin and A. Brin, London. An improved process of extracting iron from its ore, and of refining or purifying iron. December 6.

17,872. J. Dickson, Sheffield. An improved method of preparing sectional steel. December 7.

17,889. J. Dickson, Sheffield. An improved method of producing steel for shells and other projectiles. December 7.

17,909. A. J. Boult.—From W. Ross and H. D. Bush, Canada. Improvements in or relating to the upsetting of metals and in apparatus therefor. December 7.

17,930. M. H. Simpson, London. Improvements in the preparation and treatment of bromine for the extraction of gold from ore or for other purposes. December 7.

17,938. J. T. Blomfield and W. D. Bohm, London. Improvements in gold extraction. December 8.

18,004. A. Clement-Conti, London. A new or improved apparatus for treatment of auriferous sand and other matters containing free gold. December 10.

18,020. P. R. Shill, London. Improvements in machinery for crushing or reducing and amalgamating auriferous quartz or ores, and for crushing or reducing other materials. December 10.

18,024. H. A. Hunicke, London. Improvements in and relating to the extraction of zinc from its ores. Complete Specification. December 10.

18,088. L. Keyling, London. Process and apparatus for producing fragments or pieces of iron, steel, and metal. Complete Specification. December 11.

18,114. H. Aitken, Glasgow. Improvements in obtaining gold or other metals from their ores or other materials. December 12.

18,178. D. Davy, London. Improved apparatus for traversing and turning ingots and blooms upon the feed rollers of rolling mills. December 12.

18,191. J. McCann, Millom, Cumberland. The Excelsior blast furnace tuyere. Complete Specification. December 13.

18,211. G. E. Vaughan.—From L. Weiller, France. Improvements in the manufacture of metallic alloys or compounds. December 13.

18,218. G. Prout and D. Murry, London. An improved method of coating iron or steel with copper and other comparatively non-oxidisable metals. December 13.

COMPLETE SPECIFICATIONS ACCEPTED.

1887.

16,853. W. L. Wise.—From The Schweizhische Metallurgische Gesellschaft, Switzerland. Apparatus for producing aluminium and other metals and their alloys, and operating the same. December 8.

17,033. A. Parkes. Extracting gold and silver from ores or compounds, and solvents for such metals. December 15.

17,111. M. Gledhill. The casting of hollow metal ingots, and apparatus therefor. December 7.

17,112. H. H. Lake.—From C. Netto. Manufacture of potassium, sodium, and metals of the alkaline earths, and apparatus therefor. November 21.

17,532. H. H. Lake.—From C. Netto. Manufacture of aluminium, and apparatus therefor. December 22.

1888.

191. J. M. Bennett. Smelting and refining furnaces. December 8.

767. M. N. d'Andria. Recovering tin from tinned metal. November 24.

1068. J. W. Wailes. Apparatus for cutting and shaping heated metal. December 22.

1886. W. H. Beck.—From A. Sentex, C. Maréchal, and A. Saunier. Manufacture of bronze. December 15.

1914. J. Hornsby and G. E. Coupe. Apparatus for separating gold from its ores. December 15.

4254. E. W. Gillon, F. P. Smith, and G. W. Wales. Treating and tempering open-hearth or Bessemer steel wire. December 15.

6879. E. G. Chamberlain. Compound railway rail. December 1.

11,620. M. F. H. Lintz. Manufacture of tin and terne plates, and apparatus therefor. December 1.

13,830. O. M. Thowless. Production of manganese alloys. November 24.

14,937. E. Norton and J. G. Hodgson. Manufacture of sheet metal, and apparatus therefor. November 21.

15,156. H. S. Blackmore. Manufacture of sodium. December 8.

16,848. A. Gutensohn and J. M. James. Apparatus for pickling or cleaning metals to be coated with tin or other metal. December 22.

XI.—ELECTRO-CHEMISTRY AND ELECTRO-METALLURGY.

APPLICATIONS.

16,629. F. Cramer, Berlin. Improvements in galvanic batteries. November 16.

16,666. W. P. Thompson.—From P. Naef, Switzerland. Improvements in or appertaining to the manufacture of peroxide of lead. November 16.

16,728. N. G. Thompson, London. Improvements in dynamo-electric machines. November 17.

16,809. H. I. Harris and J. Garford, London. Improvements in voltaic batteries. November 19.

17,002. T. Cond, London. An improved fluid for primary batteries. November 22.

17,008. F. V. Schiödt, London. Improvements in dynamo machines. Complete Specification. November 22.

17,223. L. Pazet, London. Improvements relating to electric secondary batteries or accumulators, and to the manufacture of electrodes therefor. Complete Specification. November 27.

17,225. L. Paget, London. Improvements relating to the generation of electricity and the simultaneous production of zinc chloride and other by-products. Complete Specification. November 27.

17,310. P. M. Justice.—From E. L. Smith, United States. Improvements in electro depositing cells. Complete Specification. November 28.

17,489. L. Fouque, London. Improvements in electric batteries. November 30.

17,537. M. Bailey and J. Warner, London. Improvements in cells for secondary batteries. December 1.

17,623. H. J. Kirkman, London. Utilisation of flux skimmings from galvanising works. December 3.

17,634. H. I. Harris and J. Garford, London. Improvements in voltaic batteries. December 4.

17,777. Sir C. S. Forbes, Bart., London. An improved ammeter. December 5.

17,783. G. A. Sweetser, London. Improvements in the manufacture of wire or tape from electro-deposited metal, for electrical or other purposes. December 5.

18,022. C. E. L. Brown, London. Improvements in dynamo-electric machines. December 10.

18,116. A. B. Atkinson and H. Metcalf, Brighton. Improvements in electrical primary batteries. December 12.

COMPLETE SPECIFICATIONS ACCEPTED.

1887.

17,138. R. H. Courtenay. Apparatus for generating and converting electric currents. December 8.

1888.

2308. M. Bailey and J. Warner. Manufacturing woven plates for secondary batteries. December 22.

3312. E. Tyer. Voltaic batteries. December 8.

10,694. I. A. Timmis. Elements for secondary batteries. December 22.

11,681. C. E. Liebert and S. A. Rosensthal. Electric batteries, and exciting liquids or compounds therefor. December 1.

XII.—FATS, OILS, AND SOAP MANUFACTURE.

APPLICATIONS.

16,845. J. Gott, London. Improvements in the manufacture of soft soap for laundry, cleansing, and other purposes. November 20.

17,621. J. Baxeres, London. Camphene and borneol soaps. December 3.

17,628. W. Michell and S. Picard, London. An improved process and composition for extracting oil from and cleaning cotton waste. December 3.

COMPLETE SPECIFICATIONS ACCEPTED.

1888.

550. R. Hunt. Purification of cotton-seed oil, and apparatus therefor. December 15.

2308. O. H. von Wilke. Manufacture of soap soluble in sea water. December 15.

2796. J. Meek. Improved soap tablets or cakes. December 22.

9790. J. M. McCallum. Improved soap powder and method of manufacturing same. December 1.

XIII.—PAINTS, PIGMENTS, VARNISHES, AND RESINS.

APPLICATIONS.

17,534. M. A. Harmeh, London. An improved polish for furniture and other articles. Complete Specification. December 1.

17,679. A. J. Boult.—From W. Kiel, United States. Improvements in vulcanised plastic compounds. Complete Specification. December 1.

17,865. J. Hickisson, London. Improvements in the manufacture of solid ink pencils for marking upon cotton, linen, and other textile fabrics, and in mordants for use therewith. December 6.

17,916. F. J. Binns and R. J. Paris, Liverpool. New or improved covering composition, applicable for protecting ships' bottoms and the like. December 8.

COMPLETE SPECIFICATIONS ACCEPTED.

1887.

15,771. F. Crane.—From W. D. Field. Varnishes. November 21.

1888.

618. C. P. Dimitry. Indelible ink. November 21.

14,854. B. F. McIntyye. Fireproofing and preserving compounds. December 1.

15,997. A. J. Boult.—From C. H. Eichler. Manufacture of paint. December 8.

XIV.—TANNING, LEATHER, GLUE, AND SIZE.

APPLICATIONS.

16,731. E. Edwards.—From J. Gautier, France. An improved cement to be used as a substitute for glue. November 17.

17,708. A. A. Blandy, London. Improvements in the treatment of leather waste suitable for being applied to the manufacture of boots and shoes and to other useful purposes. December 1.

17,782. P. A. Jesson, London. Improvements in machinery for treating hides, skins, leather, and other materials. December 5.

XV.—AGRICULTURE, MANURES, ETC.

APPLICATION.

17,037. F. Joaquin. R. Carulla, and E. M. Glover. *See* Class VII.

XVI.—SUGARS, STARCHES, GUMS, ETC.

APPLICATIONS.

16,703. C. Steffen, London. Improvements in lixiviating batteries for raw sugar or sugar mass. Complete Specification. November 17.

17,339. A. Baumgarth, London. Improvements in refining sugar and apparatus therefor. November 28.

17,363. T. Parker and E. A. Robinson, Manchester. Improvement in the method of and apparatus for burning sea-weed, and recovering the products of the combustion. November 29.

COMPLETE SPECIFICATIONS ACCEPTED.

1888.

642. E. Easton and S. Hoyland. Apparatus for extracting juice from sugar canes. December 15.

1392. B. J. R. Newlands and J. B. Alliott. Apparatus for filtering saccharine or other solutions, and appliances for cleaning the said apparatus. December 8.

2511. A. Chapman. Apparatus for evaporating saccharine or other solutions or liquids. December 1.

16,397. F. Bauder. Refining sugar, and treatment of syrup obtained therefrom. December 15.

16,703. C. Steffen. Lixiviating batteries for raw sugar or sugar mass. December 22.

XVII.—BREWING, WINES, SPIRITS, ETC.

APPLICATIONS.

16,885. H. H. Lake.—From J. W. Tree, United States. Improvements in apparatus for the manufacture of malt. Complete Specification. November 20.

17,018. A. Gough, jun., London. Improvements in the making of malt. November 23.

17,338. H. E. Sorel, London. Improvements in the treatment of commercial alcohols. November 28.

17,549. E. Barbe, London. Improvements in or relating to the manufacture of vinegar. Complete Specification. June 1, 1888; ante-dated under section 103 of Patents Act of 1883.

17,968. J. Lennox and A. B. Lennox, London. An improved method for purifying and maturing whisky and other spirits, and apparatus employed therein. December 8.

17,972. I. Traube, London. Improvements relating to the separation of mixtures of ethyl alcohol and water from fusel oil and other impurities, and to apparatus therefor. December 8.

COMPLETE SPECIFICATIONS ACCEPTED.

1888.

1528. C. D. Abel.—From E. Kuderlin, J. W. van Leenhoff, A. Wernicke, A. Wilhelmi, and A. Kohlmann. Preparation of materials containing starch for direct treatment in brewing processes, the production of malt, and other saccharifying processes. December 8.

1558. W. S. Squire. Manufacture of yeast. December 8.

1622. R. P. Preston and R. W. Preston. Improvements in or relating to stills. December 8.

6869. J. Y. Johnson.—La Société Française des Alcools purs, of Paris. Process for purifying alcohol and obtaining aldehydes and acetones. November 21.

14,988. R. R. Hutchinson. "Mashers" and "mixers" as employed in brewing and other processes, and applying electricity as a motive power for the same. November 24.

XVIII.—CHEMISTRY OF FOODS, SANITARY CHEMISTRY, AND DISINFECTANTS.

APPLICATIONS.

A.—Chemistry of Foods.

17,226. H. T. Champney, London. An improved alimentary compound. Complete Specification. November 27.

17,531. E. Acres, London. A new and improved process for preserving meat, fish, and other articles of food in tin and other boxes. December 1.

17,899. A. A. Brehier, London. Improvements in the method of preserving fresh meat, fowl, game, fish, eggs, cheese, fruit, vegetables and other alimentary substances. December 7.

18,079. G. D. Wheaton, London. Improved means to be used in the preservation of perishable substances. December 11.

B.—Sanitary Chemistry.

16,774. B. R. Phillipson, Dublin. The distribution of sewage, which he has named "The terrace system of sewage distribution." November 19.

17,703. H. H. Lake.—From J. Hirshfeld, United States. Improved methods and apparatus for the treatment of human excrement and other feculent matter. Complete Specification. December 5.

17,962. J. Wilkinson and J. B. Alliott, London. Improvements in destructors, or apparatus for treating refuse. December 8.

18,243. H. H. Lake.—From S. de Melho Aserappa, Ceylon. Improvements relating to the treatment of human excrement and to apparatus therefor. December 13.

C.—Disinfectants.

16,762. E. Smith, Manchester. Improvements in soap to be used as an insecticide and for cleansing plants, dogs, and other animals. November 17.

17,012. G. R. Tweedie, Liverpool. New or improved compositions for disinfecting, deodorising, or antiseptic purposes. November 23.

17,843. W. H. Daniels, London. An improved antiseptic compound for preserving perishable articles. *Complete Specification.* December 6, but ante-dated (under sec. 103, Patents Act, 1883) June 2.

COMPLETE SPECIFICATIONS ACCEPTED.

A.—Chemistry of Foods,

1888.

16,335. H. Stachelhaus. Manufacturing conserved meats. December 15.

B.—Sanitary Chemistry.

1888.

1161. A. J. Capron. Purification of sewage and impure waters. December 1.

1884. R. Muirhead. Apparatus for separating liquids and semiliquids *from solids,* especially applicable to sewage sludge, slip, slurry, and such bodies. December 15.

9312. B. Jagger. Means for purifying sewage and other water. December 22.

C.—Disinfectants.

1888.

1696. W. Black and W. L. Rennoldson. Preparation of antiseptics. December 8.

XIX.—PAPER, PASTEBOARD, Etc.

APPLICATIONS.

16,932. G. Tidcombe, London. Improvements in rolls for pulping fibres for the manufacture of paper and like uses. November 21.

16,943. J. Maclear, London. Improvements in or applicable to the treatment of esparto grass. November 21.

17,060. F. C. Danvers, Ealing. Improvements in the manufacture of artificial ivory. November 23.

17,227. H. H. Lake.—From C. H. Atkins, United States. Apparatus for removing metallic particles from paper pulp. Complete Specification. November 27.

17,263. E. M. H. Andreoli. *See* Class VI.

17,468. A. Lundberg, Northfleet. Improvements in and relating to boilers for use in treating wood or other fibrous matters with acid solutions. Complete Specification. November 30.

17,581. A. Johnston and C. G. Hayward, Ipswich. Uninflammable paper. December 3.

17,692. O. Imray.—From J. R. France, United States. Improvements in *manufacture of celluloid and similar compounds, and* apparatus therefor. Complete Specification. December 4.

17,766. W. H. Caldwell, London. Improvements in the manufacture of paper. December 5.

17,779. J. von der Poppenburg, Berlin. Improvements in the method of manufacturing papers coated with metallic foil. December 5.

17,828. J. H. Shorrock, London. Improvements in or relating to machines for straining pulp employed for making paper, and in automatic apparatus connected therewith. December 6.

17,876. A. Lundberg, Northfleet. Improvements in and relating to boilers for use in treating wood or other fibrous matters with acid solutions. Complete Specification. December 7.

18,003. F. Salomon and H. Brungger, London. Improved method of and means for protecting apparatus used in the manufacture of sulphite cellulose. December 10.

18,174. G. F. Stickings, London. Improvements in the manufacture of paper, and in machinery or apparatus employed therein. December 12.

COMPLETE SPECIFICATIONS ACCEPTED.

1888.

2208. J. Scott. Strainer-plates for straining pulp in the manufacture of paper or other industries. December 8.

12,687. C. W. J. L. Robert. Filigranes for water-marking paper. December 8.

16,165. O. Imray.—From J. R. France. Manufacture of collars, cuffs, &c. from celluloid, xylonite, and other pyroxyline compounds. December 15.

XX.—FINE CHEMICALS, ALKALOIDS, ESSENCES, AND EXTRACTS.

APPLICATIONS.

17,075. J. Y. Johnson.—From F. von Heyden, Germany. Improvements in the manufacture or production of paroxybenzoic acid. November 23.

17,627. R. I. Hunter, London. Improvements in dental anodynes or obtundents. December 3.

COMPLETE SPECIFICATION ACCEPTED.

1888.

12,179. C. Liebermann and F. Giesel. Treatment of amorphous alkaloids obtained in the preparation of cocaine. December 1.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

APPLICATION.

16,715. A. R. Brown, London. Improvements in or relating to printing photographs, especially "blue printing," and in apparatus therefor. November 17.

COMPLETE SPECIFICATION ACCEPTED.

1888.

8508. W. Guttenberg. *A lamp for photographing by magnesium light.* December 22.

[illegible]XII.—EXPLOSIVES, MATCHES, Etc.

APPLICATIONS.

[illegible] T. Nordenfelt, London. Improvements in torpedoes. [illegible] 16.

[illegible] H. J. Allison.—From C. W. Valney, United States. Im[illegible]ts in explosive compounds. Complete Specification. [illegible] 20.

[illegible] H. M. Chapman. Improvements in or relating to percus[illegible] or fuses. November 22.

[illegible] G. A. Kitchen, St. Helens. A new explosive intended as [illegible] for gunpowder as now generally used for blasting and [illegible] purposes, and also for fire-arms and ordnance of all [illegible]ovember 23.

[illegible] T. Nordenfelt, London. Improvements in percussion fuses. [illegible] 26.

[illegible] Sayers, Glasgow. Improvements in explosive com[illegible]ovember 27.

[illegible] V. Newton.—From A. Nobel, France. Improvements [illegible]ufacture of explosive compounds. November 28.

[illegible] R. Hodgkinson, London. Improvements in the manu[illegible] treatment of explosives to better control combustion or [illegible]tonation. November 30.

[illegible] Ritter von Dahmen, London. An improved manufac[illegible]o-glycerin and dynamite. December 3.

[illegible] Parker and A. E. Robinson, Manchester. Improvements [illegible]ufacture of phosphorus. December 5.

[illegible] S. Simpson, London. An improvement connected with [illegible]hells. December 5.

[illegible] T. Nordenfelt, London. Improvements in base fuses for [illegible] December 12.

[illegible] Trench, London. Improvements in explosives. Decem-[illegible]

[illegible]MPLETE SPECIFICATIONS ACCEPTED.

1888.

[illegible]rr. Forming solutions and compounds of nitro-cellulose. [illegible]1.

[illegible]ain and A. A. Craig. Signal-lights and other fireworks [illegible]a and elsewhere. November 21.

[illegible] Quick. Cartridges for ordnance. November 24.

[illegible] Greenwood. Machines for the compression of gun-[illegible] December 1.

[illegible] Brock. Ships' signal-lights, rockets, Roman candles, and [illegible]orks. December 8.

[illegible] Turpin. Manufacture of explosive. December 1.

[illegible] W Graydon. Preparing high explosives for use, and cartridges made of such explosives. December 8.

[illegible]XIII.—ANALYTICAL CHEMISTRY.

APPLICATION.

[illegible] G. K. Husberg, Arboga, Sweden. Improvements in the [illegible]termining the percentage of fat in milk. November 17.

[illegible]d and Published by Eyre and Spottiswoode, East Harding [illegible]don, E.C., for the Society of Chemical Industry.